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## Assessment of Financial Cost of Accident in Building Construction Sites in Abuja

**Ebije-Odeh Onjefu John, Dr. Y.D MOHAMMED**

*Department of Quantity Surveying, Federal University of Technology Minna, Niger State*

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**Keyword:**

*Accident, Accident cost, Building construction, Construction sites, Safety,*

**Abstract**

*The construction industry has been identified with the highest occurrence rate of accidents. Financial cost of construction accidents on building construction sites is an issue that constitute the problem of this study; a lot of financial losses are applicable to it both in human and material losses. The objectives of the study were to identify and rank the accidents peculiar to building construction projects in Abuja, determine the relationship between accident cost and building construction cost and determine whether the cost of accident predicts cost of construction. The study began with the review of literature, books, journals and web pages. A field survey was conducted and archive data were used from construction companies. Questionnaires were administered through simple random sampling technique in Abuja. The data was analysed using correlation and regression. According to the research, fall from height was rated the highest with 24%. It was closely followed by fall from same level with 20%. Collapse of scaffold was ranked third with 15%. Injury from equipment, slip and trip, struck by moving object and collapse of building or part of it were ranked the least. There is a positive impact between accident costs on the total cost of building construction.*

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## **Introduction**

The construction industry covers a wide range of activities ranging from large-scale civil engineering projects to very small house extension. The industry has been identified with the highest occurrence rate of accidents compared to any other industry. Anny and Sritomo (2015) stated that a construction project is prone to accidents due to its dangerous characteristics and unpredictable changes. Jallon (2011) asserted that accident will give a negative impact to the employers, employees and even to the nation as a whole.

Accidents as defined by Health and Safety Executives (HSE, 2017) as any unplanned event that results in injury or ill health of people, or damage or loss of property, plant, materials or the environment or loss of a business opportunity. Hale and Walker (2012) opined the prevention of accident is essential to secure and maintain a healthy and safe construction site so as to avoid the financial costs of construction accidents.

Financial cost of construction accidents represent the losses incurred by the private investor such as contractors, due to the occurrence of construction site accidents. It is a great challenge for all those involve in the construction industry to improve this situation by taking effective action to minimise the risk of accidents and ill health. Financial cost of accidents is relatively complex since many visible and hidden costs should be taken into account in order to get an accurate estimate. Gavius (2009) asserted that accident cost estimation is a lengthy process and requires proper training and guidance before getting use to it.

Any accident or incidence of ill health will cause both direct and indirect cost. Sun (2010), stated that there are four (4) cost components that are important in estimating the indirect cost; they include productivity cost, worker replacement cost, legal and administrative cost and investigation cost. Kamaruzzaman and Sing (2010), asserted that accident does not only cause injury to workers, it can also destroy tools, equipment and materials. Direct cost includes cost of medical treatment, cost of rehabilitation of worker before he returns to work, compensation paid to injured worker, cost due to inefficiency of the worker who just recovered from injury upon resuming work. This research is aimed at assessing the extent at which accidents on building construction site affect the cost of a project.

The aim of this study is to assess impact of the financial cost of accidents on building construction project on site with a view to bring about a reduction in the cost of construction site accident.

The objectives of this study are to:

1. Identify the causes of accidents on building construction sites.
2. Identify and rank the accidents peculiar to building construction project in Abuja.
3. Determine the relationship between accident cost and building construction cost.
4. Determine whether the accident cost predicts cost of construction project.

### **Methodology**

The objective of this research is to assess the financial cost of accidents on building construction projects on site. These objectives was be achieved using two main approaches mainly Primary and Secondary sources of data. The literature review was used to identify all building construction site accidents and to determine the types of accidents on building construction projects. Research journals, academic thesis and conference papers were the main sources of the secondary data gathered. The secondary data helped in shaping out the structure of the research questionnaire. The Primary source of data represents the main source of data used for the research. Two sets of questionnaires were used to collect information for this research; one was used to collect information on the types of accidents peculiar to building construction project in Abuja and the second was used to collect achieve data on the cost of accidents on previously completed projects and the building cost of those projects. The field survey involved 50 building construction companies in Abuja with over 20 years' experience in building construction project. In achieving this, the first set of the questionnaire were administered to construction professionals to collect information on peculiarity of accidents on construction sites in Abuja. The second sets of well-structured questionnaires were distributed to those construction companies with over 20 years' experience in building construction project to be filled by Registered Quantity Surveyors (RQS) who are also members of Institute of Safety Professionals of Nigeria (ISPON). The data collected was analysed using correlation and regression.

### **Results**

Table 1 shows clearly the qualification of the respondents; it means the respondents are well educated and their responses can be relied upon.

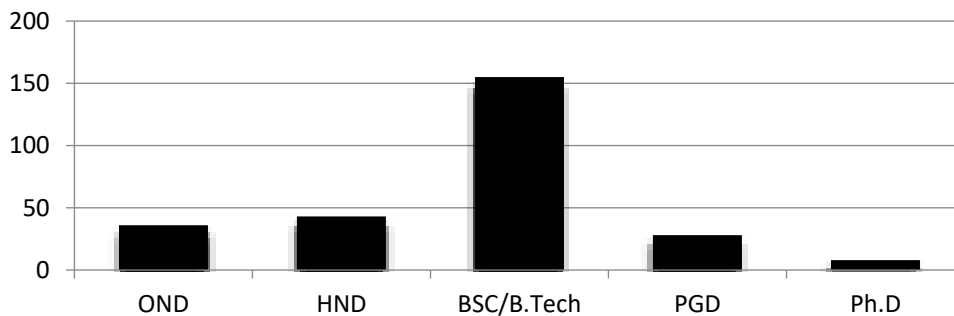
Table 1 Qualification of Respondents

<i>QUALIFICATION</i>	<i>NUMBER</i>	<i>PERCENTAGE %</i>	<i>CUMULATIVE %</i>
<i>OND</i>	36	13.33	13.33
<i>HND</i>	43	15.93	29.26
<i>BSC/B.Tech</i>	155	57.41	86.67
<i>PGD</i>	28	10.37	97.04
<i>Ph.D</i>	8	2.96	100
<i>TOTAL</i>	270	100%	

Source: Researchers survey (2019)

From the bar chart Fig 1, it shows a graphic representation of the respondents. The largest of percentage of the respondent have BSC/B.Tech

### QUALIFICATION



Source: Researchers survey (2019)

### Work Experience

Table 2 shows that the respondents have work experience in the building construction industry as such, there responses can be relied upon.

Table 2 Work Experience

<i>YEARS OF EXPERIENCE</i>	<i>NUMBER</i>	<i>PERCENTAGE %</i>	<i>CUMULATIVE %</i>
<i>0 - 5 YEARS</i>	25	9.26	9.26
<i>6 - 10 YEARS</i>	48	17.78	27.04
<i>11 - 15 YEARS</i>	69	25.56	52.60
<i>16 - 20 YEARS</i>	40	14.81	67.41
<i>21 - 25 YEARS</i>	28	10.37	77.78
<i>26 - 30 YEARS</i>	42	15.55	93.33

<b>31 YEARS AND ABOVE</b>	18	6.67	100
<b>TOTAL</b>	270	100%	

**Source:** Researchers survey (2019)

### Profession of Respondents

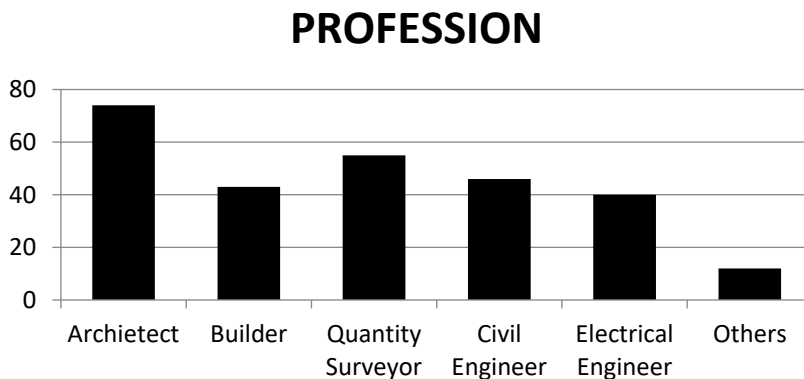
Table 3 show that all the respondents are professional in the construction industry and there opinion can be relied upon.

Table 3 Profession of Respondents

<b>PROFESSION</b>	<b>NUMBER</b>	<b>PERCENTAGE %</b>	<b>CUMULATIVE %</b>
<b>ARCHIETECT</b>	74	27.41	27.41
<b>BUILDER</b>	43	15.93	43.34
<b>QUANTITY SURVEYOR</b>	55	20.37	63.71
<b>CIVIL ENGINEER</b>	46	17.04	80.75
<b>ELECTRICAL ENGINEER</b>	40	14.81	95.56
<b>OTHERS</b>	12	4.44	100
<b>TOTAL</b>	270	100%	

**Source:** Researchers survey (2019)

Figure 2 Professions of Respondents



**Source:** Researchers survey (2019)

### Types of Accidents

Table 4 illustrates from survey, the view of respondents on the type of accident peculiar to building construction project in Abuja. The accident types were identified and rated with its frequency distribution from respondents.

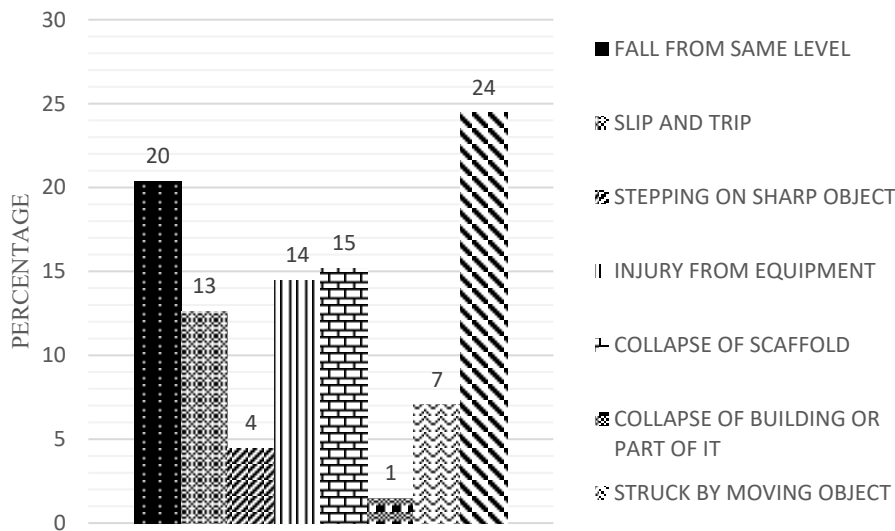
From the survey, fall from heights rated highest with a rate of 24% among the types of accidents, fall from same level rated 2<sup>nd</sup> highest with a rate of 20% among the types of accidents, collapse of scaffold rated 3<sup>rd</sup> highest with a rate of 15% among the types of accidents, injury from equipment rated 4<sup>th</sup> highest with a rate of 14% among the types of accidents. Slip and trip rated 5<sup>th</sup> highest with a rate of 13% among the types of accidents, struck by moving object rated 6<sup>th</sup> highest with a rate of 7% among the types of accidents, Stepping on sharp object rated 8<sup>th</sup> highest with a rate of 4% among the types of accidents, collapse of building or part of it rated 9<sup>th</sup> highest with a rate of 1% among the types of accidents.

Table 4 Types of Accidents

<i>S/N</i>	<i>TYPE OF ACCIDENT</i>	<i>FREQUENCY</i>	<i>PERCENTAGE</i>
1	FALL FROM SAME LEVEL	55	20%
2	SLIP AND TRIP	34	13%
3	STEPPING ON SHARP OBJECT	12	4%
4	INJURY FROM EQUIPMENT	39	14%
5	COLLAPSE OF SCAFFOLD	41	15%
6	COLLAPSE OF BUILDING OR PART OF IT	4	1%
7	STRUCK BY MOVING OBJECT	19	7%
8	FALL FROM HEIGHT	66	24%
	<b>TOTAL</b>	<b>270</b>	<b>100%</b>

**Source:** Researchers survey (2019)

**Figure 3 Types of Accidents**



**Source:** Researchers survey (2019)

### Statistical Inference

The table 5 illustrate statistical inference between cost of accident and building cost showing that there exists a strong relationship between cost of accident and building cost. A Pearson product-moment correlation coefficient was computed to assess the relationship between cost of accident and building cost.

The correlation table reveal the mean of cost of accident and building cost to be X1 and X2 respectively. The mean value of X1=267013.53 at a standard deviation of 135411.09 and the mean value of X2=152070967.77 at a standard deviation of 36184308.43 and both variables at the same number of population (N= 126). The correlation coefficient r was observed to be > 0 where r =0.406, thereby indicating a positive relationship. p = 0.000 value was observed to be < 0.05. There was a positive correlation between both variables thereby signifying that there exists a strong relationship between both variable. This has led to the acceptance of the hypothesis. Correlation is significant at the 0.01 level (2-tailed).

Table 5 Statistical Inference

	<i>V</i>	<i>N</i>	<i>Mean</i>	<i>S.Dev</i>	<i>R</i>	<i>P.val</i>	<i>Strength of relations hip</i>	<i>Inferen ce remark s</i>	<i>Action on hypathe sis</i>
<i>accide nt cost</i>	X1	126	267013.53	135411.09	0.406	0.000	Strong	SS	Accept H1

<i>buildin</i>	X	12	152070967.	36184308.	0.00
<i>g cost</i>	2	6	77	43	0

**Source:** Researchers survey (2019)

**KEY:** Statistically Significant (SS)

### Regression Analysis

Based on table 5, there is a positive and statistically significant relationship between accident cost and total cost.

From table 6, the coefficient of (R<sup>2</sup>) was observed at 16.7% suggesting a weak relationship and the connection coefficient (R) watched was 40.9% also showing a weak relationship level of relationship amidst the variables. The estimation of the F<sub>cal</sub> is 24.88 while the P-value estimation of 0.000 observed was less than 0.05. This implies that Total cost is predicted at Total cost= 123127212.51+0.000 Accident cost.

Therefore H<sub>1</sub> is accepted.

Therefore H<sub>2</sub> is accepted.

Table 6 Regression Analysis

Model		Unstandardized Coefficients		Standardized Coefficient	R/R <sup>2</sup> (%)	Adjusted R <sup>2</sup>	F <sub>cal</sub>	P <sub>va</sub>	Inf. RMK	Action on Hypothesis
		B	Std. Error	Beta						
(Constant)	Linear Regression	123127212.51	6561358.40		40.9 / 16.7	0.160	24.88	.000		H <sub>1</sub> Accepted
	accident cost	109.40	21.93	.409				.000	SS	

**Source:** Researchers survey (2019)

**KEY:** Statistically Significant (SS)

### Conclusion

Construction industry experiences accidents in different level of severity resulting to additional cost, thus altering the overall cost of executing the project. The study revealed the types of accidents peculiar to building construction projects in Abuja. According to the research, fall from height was rated the highest with 24%. It was closely followed by fall from same level with 20%. Collapse of scaffold was ranked third with 15%. Injury from equipment, slip and trip, struck by moving object and collapse of building or part of it were



ranked the least. The complexity and nature of construction activities increases the chances of frequent accidents on site. The research has shown that the study also reveals a strong relationship between the cost of accident and the building construction cost. There is a positive correlation between both variables. There is also a positive relationship between accident cost and the total cost of construction. The finding of this study reveals that accident cost increases the cost of building construction.

In conclusion, construction site activities are associated with high physical labour. Despite the frequency of these accidents on site, safety of workers on all construction sites needs to be improved. From this study, the cost of accident prevention is lower than the cost of accident on site.

The study therefore recommends that the consequences of building construction site accidents have considerable impact on the total cost of building construction projects. It is also capable of undermining the reputation of construction companies. Construction managers should ensure that only properly trained workers should be involved in construction activities on site so as to curtail or minimise the occurrence of accidents. Training and continuous education of workers on safety precautions should be carried out periodically to minimise construction site accidents. Contractors must keep accident registers on sites and keep record of all kinds of accidents from minor bruises to major and fatal accidents. This will enable the management keep track of the safety of works and improve in areas where accident continues to reoccur. Costs for Personal Protective Equipment's measures should be explored and explicitly be part of tendering and costing for the project implementation.

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